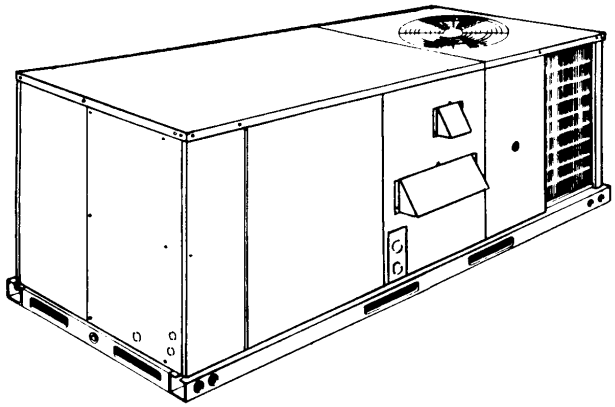
SUNLINE 2000™ GAS / ELECTRIC SINGLE PACKAGE AIR CONDITIONERS

INSTALLATION INSTRUCTION | Supersedes: 530.18-N8Y (994) | 530.18-N8Y (295)

MODELS D6CG 036, 048 & 060 (10 SEER)
MODEL D1CG 072 (9 EER)
(STYLE A & Belt Drive Option)

035-12857



GENERAL

YORK Model DCG units are single package air conditioners with gas heat designed for outdoor installation on a rooftop or a slab.

The units are completely assembled on rigid, permanently attached base rails. All piping, refrigerant charge, and electrical wiring is factory-installed and tested. The units require only electric power, gas piping and duct connections at the point of installation.

The gas-fired heaters have aluminized steel tubular heat exchangers and spark ignition with intermittent pilot.

This appliance is not to be used for temporary heating of buildings or structures under construction.

INSPECTION

As soon as a unit is received, it should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing. Refer to Form 50.15-NM for additional information.

REFERENCE

Additional information on the design, installation, operation and service of this equipment is available in the following reference forms:

- 55.70-N1 -General Installation
- 55.70-N2 -Pre-start & Post-start Check List
- 530.18-N1.2V -Economizer Accessory
- 530.18-N1.4V -Fixed Outdoor Air Damper Accessory
- 530.18-N1.6V -Motorized Outdoor Air Damper Accy.
- 530.18-N1.8V -Coil Guard
- 530.18-N2.11V -Low NOx Accessory
- 530.18-N8.2V -High Altitude Accy. (Natural Gas)
- 530.18-N8.3V -High Altitude Accy. (Propane)
- 530.18-N8.4V -Gas Piping Accessory
- 530.18-N8.12V -Propane Conversion Accessor
- 690.15-N25V -Low Ambient Accessory

Renewal Parts:

- Refer to Parts Manual for complete listing of replacement parts on this equipment.

All forms referenced in this instruction may be ordered from:

Publications Distribution Center
Unitary Products Group
P.O. Box 1592, York, PA 17405

APPROVALS

Design certified by CGA and UL listed as follows:

1. For use as a forced air furnace with cooling unit.
2. For outdoor installation only.
3. For installation directly on combustible flooring or, in the U.S.A., on wood flooring or Class A, B, or C roof covering material.
4. For use with natural gas and/or propane (LP) gas.

Not suitable for use with conventional venting systems.

Installer should pay particular attention to the words: *NOTE, CAUTION* and *WARNING*. Notes are intended to clarify or make the installation easier. Cautions are given to prevent equipment damage. Warnings are given to alert installer that personal injury and/or equipment damage may result if installation procedure is not handled properly.

FOR YOUR SAFETY

If you smell gas:
1. Open windows
2. Don't touch electrical switches.
3. Extinguish any open flame.
4. Immediately call your gas supplier.

FOR YOUR SAFETY

Do not store or use gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance.

CAUTION

THIS PRODUCT MUST BE INSTALLED IN STRICT COMPLIANCE WITH THE ENCLOSED INSTALLATION INSTRUCTIONS AND ANY APPLICABLE LOCAL, STATE, AND NATIONAL CODES INCLUDING, BUT NOT LIMITED TO, BUILDING, ELECTRICAL, AND MECHANICAL CODES.

WARNING

INCORRECT INSTALLATION MAY CREATE A CONDITION WHERE THE OPERATION OF THE PRODUCT COULD CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.

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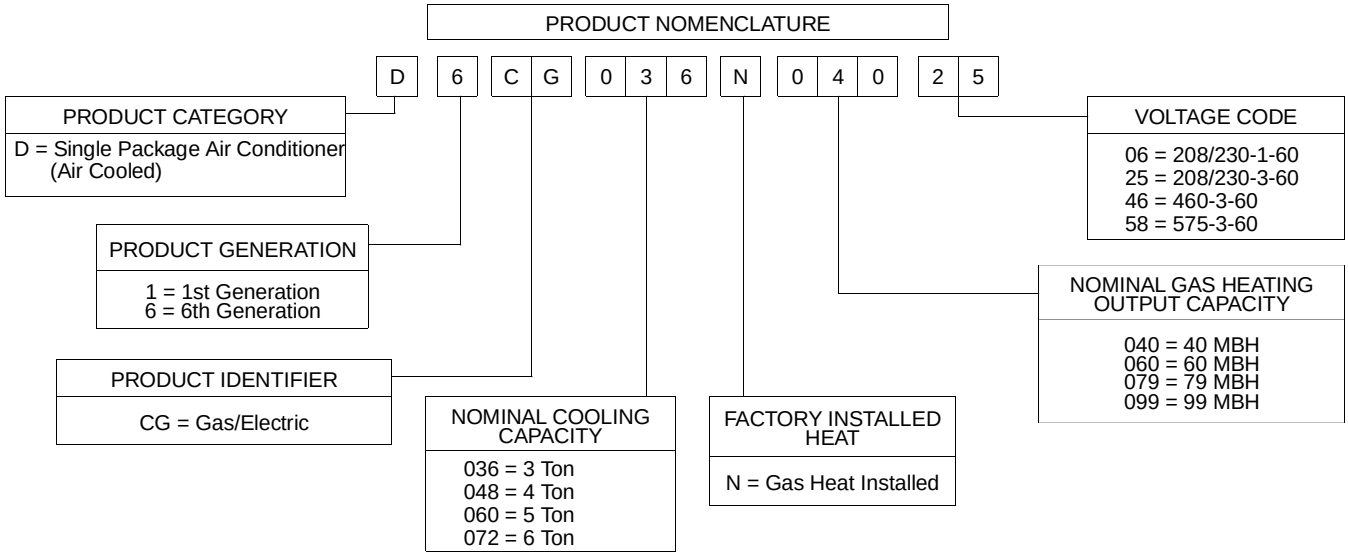


INSTALLATION

LIMITATIONS

These units must be installed in accordance with the current editions of the following national and local safety codes:
In the U.S.A.:

1. National Electrical Code ANSI/NFPA No. 70.
2. National Fuel Gas Code Z223.1.
3. Gas-Fired Central Furnace Standard ANSI Z21.47-1993.
4. Local gas utility requirements.

In Canada:

1. Canadian Electrical Code CSA C22.1
2. Current Gas Installation Codes CAN/CGA-2.3-M93.
3. Local plumbing and waste water codes.
4. Other applicable local codes.

Refer to Table 1 for Unit Application Data and to Table 2 for Gas Heat Application Data.

If components are to be added to a unit to meet local codes, they are to be installed at the dealer's and / or the customer's expense.

Size of unit for proposed installation should be based on heat loss / heat gain calculation made according to the methods of Air Conditioning Contractors of America (ACCA).

TABLE 1 - UNIT APPLICATION DATA

Model DCG		036	048	060	072
Voltage Variation Min. / Max.[1]	208/230V	187 / 253			
	460V	414 / 504			
	575V	518/630			
Supply Air CFM, Nom.		1200	1600	2000	2400
Wet Bulb Temperature (°F) of Air on Evaporator Coil, Min. / Max.		57 / 72	57 / 72	57 / 72	57 / 72
Dry Bulb Temperature (°F) of Air on Condenser Coil, Min.[2] / Max.		45 / 120	45 / 120	45 / 120	45 / 120

[1]Utilization range "A" in accordance with ARI Standard 110.

[2]A low ambient accessory is available for operation down to 0°F.

LOCATION

Use the following guidelines to select a suitable location for these units.

1. Unit is designed for outdoor installation only.
2. Condenser coils must have an unlimited supply of air. Where a choice of location is possible, position the unit on either north or east side of building.

WARNING: Excessive exposure of this furnace to contaminated combustion air may result equipment damage or personal injury. Typical contaminates include: permanent wave solutions, chlorinated waxes and cleaners, chlorine based swimming pool chemicals, water softening chemicals, carbon tetrachloride, Halogen type refrigerants, cleaning solvents (e.g. perchloroethylene), printing inks, paint removers, varnishes, hydrochloric acid, cements and glues, antistatic fabric softeners for clothes dryers, masonry acid washing materials.

3. For ground level installation, use a level concrete slab with a minimum thickness of 4 inches. The length and width should be at least 6 inches greater than the unit base rails. Do not tie slab to the building foundation.
4. Roof structures must be able to support the weight of the unit and its options and / or accessories. Unit must be installed on a solid level roof curb or appropriate angle iron frame.

CAUTION: If a unit is to be installed on a roof curb or special frame other than a YORK roof curb, gasketing must be applied to all surfaces that come in contact with the unit underside.

5. Maintain level tolerance to 1/2" maximum across the entire length or width of the unit.
6. Elevate the unit sufficiently to prevent any blockage of the air entrances by snow in areas where there will be snow accumulation. Check the local weather bureau for the expected snow accumulation in your area.

RIGGING AND HANDLING

Exercise care when moving the unit. Do not remove any packaging until the unit is near the place of installation. Rig the unit by attaching chain or cable slings to the lifting holes provided in the base rails. Spreaders, whose length exceeds the largest dimension across the unit, MUST be used across the top of the unit.

BEFORE LIFTING A UNIT, MAKE SURE THAT ITS WEIGHT IS DISTRIBUTED EQUALLY ON THE CABLES SO THAT IT WILL LIFT EVENLY.

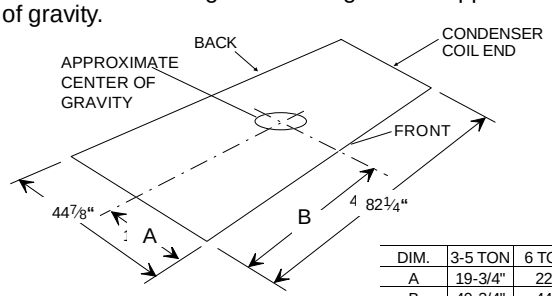
Units may also be moved or lifted with a forklift. Slotted openings in the base rails are provided for this purpose.

LENGTH OF FORKS MUST BE A MINIMUM OF 42".

Remove the nesting brackets from the four corners on top of the unit. All screws that are removed when taking these brackets off must be replaced on the unit.

CAUTION: An adhesive backed label is provided over the outside of the combustion air inlet opening to prevent moisture from entering the unit which could cause damage to electrical components. Allow this closure label to remain in place until the combustion air hood is to be installed (refer to Figure 6).

Refer to Table 4 for unit weights and to Figure 1 for approximate center of gravity.



DIM.	3-5 TON	6 TON
A	19-3/4"	22"
B	40-3/4"	44"

FIG. 1 - CENTER OF GRAVITY

CLEARANCES

All units require certain clearances for proper operation and service. Installer must make provisions for adequate combustion and ventilation air in accordance with Section 5.3, Air for Combustion and Ventilation of the National Fuel Gas Code, ANSI Z223.1 (in U.S.A.) or Sections 7.2, 7.3 or 7.4 of Gas Installation Codes CAN/CGA-B149.1 and .2 (in Canada) and/or applicable provisions of the local building codes. Refer to Figure 9 for the clearances required for combustible construction, servicing, and proper unit operation.

WARNING: Do not permit overhanging structures or shrubs to obstruct condenser air discharge outlet, combustion air inlet or vent outlet.

DUCTWORK

Ductwork should be designed and sized according to the methods in Manual Q of the Air Conditioning Contractors of America (ACCA).

A closed return duct system shall be used. This shall not preclude use of economizers or outdoor fresh air intake. The supply and return air duct connections at the unit should be made with flexible joints to minimize the transmission of noise.

The supply and return air duct systems should be designed for the CFM and static requirements of the job. They should NOT be sized to match the dimensions of the duct connections on the unit.

CAUTION: When fastening ductwork to the side duct flanges on the unit, insert the screws through the duct flanges only. DO NOT insert the screws through the casing.

Outdoor ductwork must be insulated and waterproofed.

Refer to Figure 9 for information concerning side and bottom supply and return air duct openings.

FILTERS

1" filters are supplied with each unit. 2" replacement filters may be used with no modification to the filter racks. Filters must always be installed ahead of the evaporator coil and must be kept clean or replaced with same size and type. Dirty filters will reduce the capacity of the unit and will result in frosted coils or safety shutdown. Minimum filter area and required sizes are shown in Table 4.

CONDENSATE DRAIN

Plumbing must conform to local codes. Use a sealing compound on male pipe threads. Install a condensate drain line from the 3/4" PVC female connection on the unit to spill into an open drain.

NOTE: The condensate drain line MUST be trapped to provide proper drainage. See Figure 2.

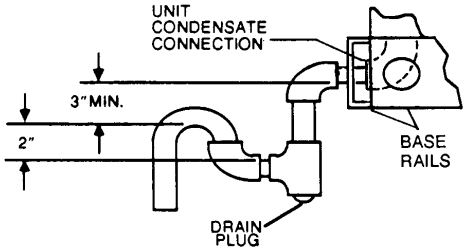


FIG. 2 - RECOMMENDED DRAIN PIPING

SERVICE ACCESS

Access to all serviceable components is provided by the following removable panels:

- Compressor compartment
- Burner compartment
- Blower compartment
- Main control box
- Filter compartment
- Motor access (on units with belt-drive option)

Refer to Figure 9 for location of these access panels.

CAUTION: Make sure that all screws are replaced on the unit to maintain an air-tight seal.

THERMOSTAT

The room thermostat should be located on an inside wall approximately 56" above the floor where it will not be subject to drafts, sun exposure, or heat from electrical fixtures or appliances. Follow manufacturer's instructions enclosed with thermostat for general installation procedure. Color coded insulated wires (#18 AWG) should be used to connect thermostat to unit. See figure 3 for wiring details.

NOTE: If the unit has an economizer, remove jumper J1 from terminals 8 and 10 on the relay board to prevent simultaneous operation of the compressor and the economizer. If you want to energize the compressor for supplemental cooling during the economizer operation, use a thermostat with two stages of cooling.

POWER AND CONTROL WIRING

Field wiring to the unit must conform to provisions of the National Electrical Code (NEC), ANSI / NFPA 70-1987 (in USA) current Canadian Electric Code (CEC) C22.1 (in Canada), and / or local ordinances. The unit must be electrically grounded in accordance with the N.E.C. ANSI / NFPA 70 or local codes.

Voltage tolerances which must be maintained at the compressor terminals during start-up and running conditions are indicated on the unit Rating Plate and Table 1.

The internal wiring harness furnished with this unit is an integral part of a UL and CGA design certified unit. Field alteration to comply with electrical codes should not be required.

A disconnect switch should be field provided for the unit. The switch must be separate from all other circuits. Refer to Figure 9 for installation location. If any of the wire supplied with the unit must be replaced, replacement wire must be of the type shown on the wiring diagram.

Electrical lines must be sized properly to carry the load. USE COPPER CONDUCTORS ONLY. Each unit must be wired with a separate branch circuit fed directly from the meter panel and properly protected.

CAUTION: When connecting electrical power and control wiring to the unit, waterproof type connectors MUST BE USED so that water or moisture cannot be drawn into the unit during normal operation. The above waterproofing conditions will also apply when installing a field-supplied disconnect switch.

Refer to Figure 3 for typical field wiring and to the appropriate unit wiring diagram for control circuit and power wiring information.

BLOWER SPEED SELECTION

Three blower motor speeds are available on the direct-drive units. The speed selection for the direct-drive units is determined by the CFM and ESP requirements of the applications. All units with belt-drive option have an adjustable motor pulley to achieve the above conditions.

All direct-drive units with 208/230 voltage are shipped with the wire labeled #116 connected to the "HIGH" speed tap on the blower motor. If a lower blower motor speed is desired, this wire should be moved to the "MED" or "LOW" speed tap on the motor for the speed desired.

All direct-drive units with 460 and 575 voltage are shipped with the wire labeled #116 connected to the "HIGH" speed tap on the blower motor. If the medium speed is required, connect wire #116 to the "MED" speed tap and the blue motor lead to the "HIGH" speed tap. If the low speed is required, connect wire #116 to the "LOW" speed tap, the blue motor lead to the "HIGH" speed tap and the orange motor lead to the "MED" speed tap.

COMPRESSORS

On some units the compressor is mounted on springs which have been tightened down for shipment only.

After this unit is installed, back out the compressor bolts until the sleeve clears the top grommet.

CAUTION: Do Not loosen compressor mounting bolts.

TABLE 2 - GAS HEAT APPLICATION DATA

Input Capacity, (Mbh)	Output Capacity, (Mbh)	Available on Models	Gas Rate[1] ($Ft.^3$/Hr.)	Temp. Rise °F At Full Input [2]	
				Min.	Max.
50	40	3 Ton	47	15	45
75	60	4 Ton	70	25	55
100	79	3/5/6 Ton	93	40/25/25	70/55/55
125	99	4/5/6 Ton	116	45/35/35	75/65/65

NOTE: Gas Heaters are shipped available for natural gas, but can be converted to L.P. with Kit Model No. 1NP0434. All furnaces meet the latest California seasonal efficiency requirements.

[1]Based on 1075 Btu/Ft^3.

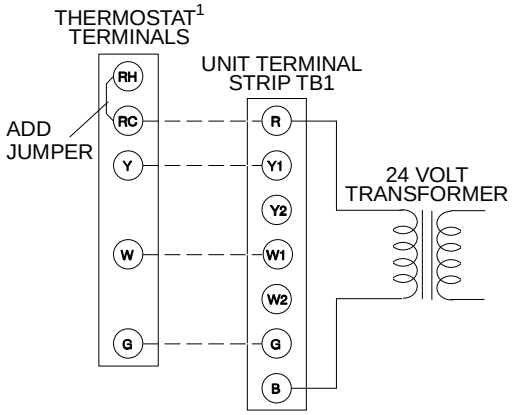
[2]The air flow must be adjusted to obtain a temperature rise within the range shown.

COMBUSTION DISCHARGE

The products of combustion are discharged horizontally through a screened opening on the gas heat access panel.

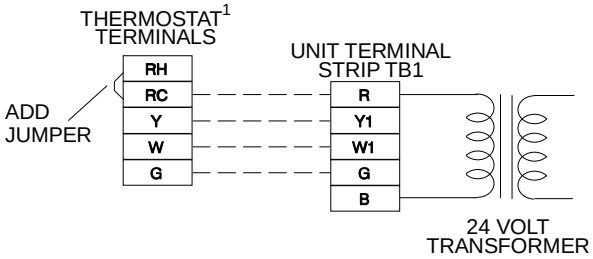
CONTROL WIRING

COOLING / HEATING (24 VOLT THERMOSTAT)

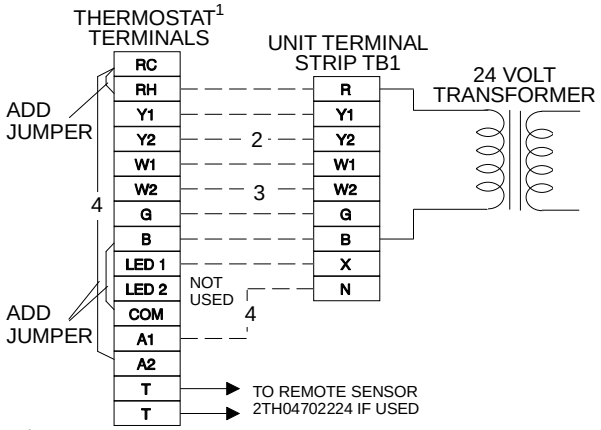


[1] 24 VOLT THERMOSTAT 2TH07701024. IF THE UNIT HAS AN ECONOMIZER, REMOVE JUMPER J1 FROM TERMINALS 8 AND 10 ON THE RELAY BOARD TO PREVENT SIMULTANEOUS OPERATION OF THE COMPRESSOR AND THE ECONOMIZER. IF YOU WANT TO CONTROL THE ECONOMIZER ON A SECOND STAGE OF COOLING OR HAVE AN ELECTRIC HEAT ACCESSORY WITH TWO STAGES OF HEAT, USE THERMOSTAT 2TH04701024.

COOLING / HEATING (24 VOLT ELECTRONIC THERMOSTAT)



COOLING / HEATING (24 VOLT ELECTRONIC THERMOSTAT)



[1] ELECTRONIC PROGRAMMABLE THERMOSTAT 2ET04700224 (INCLUDES SUBBASE) TO CONTROL ECONOMIZER ON SECOND STAGE OF COOLING, REMOVE JUMPER J1 FROM TERMINALS 8 AND 10 ON THE RELAY BOARD.

[2] SECOND STAGE COOLING IS NOT REQUIRED ON UNITS LESS ECONOMIZER.

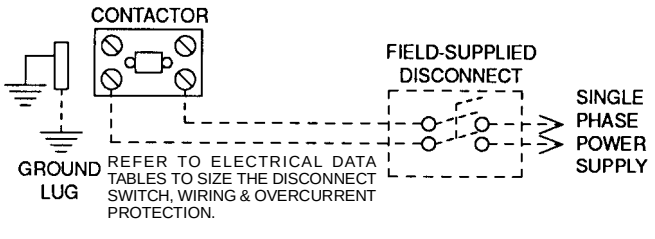
[3] SECOND STAGE HEATING IS ONLY REQUIRED ON UNITS WITH A TWO STAGE ELECTRIC HEATER.

[4] REMOVE JUMPER J2 FROM TERMINALS 4 AND 9 ON JUMPER PLUG CONNECTOR P6 ON UNITS WITH ECONOMIZER. TERMINALS A1 AND A2 PROVIDE A RELAY OUT-PUT TO CLOSE THE OUTDOOR ECONOMIZER DAMPERS WHEN THE THERMOSTAT SWITCHES TO THE SET-BACK POSITION.

[1] ELECTRONIC PROGRAMMABLE THERMOSTAT 2ET07701024 (INCLUDES SUBBASE). IF THIS UNIT HAS AN ECONOMIZER, REMOVE JUMPER J1 FROM TERMINALS 8 AND 10 ON THE RELAY BOARD TO PREVENT SIMULTANEOUS OPERATION OF THE COMPRESSOR AND THE ECONOMIZER. IF YOU WANT TO CONTROL THE ECONOMIZER ON A SECOND STAGE OF COOLING, USE THERMOSTAT 2ET04700224.

CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

POWER WIRING


CONTACTOR
FIELD-SUPPLIED DISCONNECT
SINGLE PHASE POWER SUPPLY
GROUND LUG
REFER TO ELECTRICAL DATA TABLES TO SIZE THE DISCONNECT SWITCH, WIRING & OVERCURRENT PROTECTION.

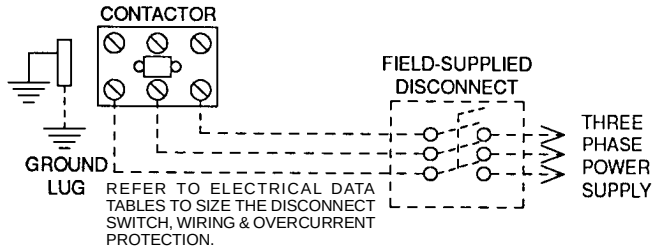

CONTACTOR
FIELD-SUPPLIED DISCONNECT
THREE PHASE POWER SUPPLY
GROUND LUG
REFER TO ELECTRICAL DATA TABLES TO SIZE THE DISCONNECT SWITCH, WIRING & OVERCURRENT PROTECTION.

FIG. 3 - TYPICAL FIELD WIRING

DISCONNECT SWITCH BRACKET FOR UNITS WITH OPTIONAL BELT-DRIVE BLOWER

A special bracket for mounting a field-supplied disconnect switch is provided in each unit ordered with an optional belt-drive supply air blower. The bracket is shipped inside the blower compartment taped to the top of the blower housing. Install the bracket on the left hand side of the unit as shown in Figure 9. Several existing screws at the top of the unit and one screw approximately midway down from the top will be used for mounting the bracket. Screws should be loosened only - NOT REMOVED. Matching holes in the bracket have elongated keyways allowing easy installation. Re-tighten screws after bracket is in place to ensure panels will remain leak tight.

GAS PIPING

Proper sizing of gas piping depends on the cubic feet per hour of gas flow required, specific gravity of the gas and the length of run. “National Fuel Gas Code” Z223-1992 (in the USA), or the current Gas Installation Codes CAN/CGA-B149.1 and .2 (in Canada) should be followed in all cases unless superseded by local codes or gas company requirements. Refer to Table 3.

TABLE 3 - PIPE SIZING

Length in Feet	Nominal Iron Pipe Size			
	1/2 in.	3/4 in.	1 in.	1-1/4 in.
10	132	278	520	1,050
20	92	190	350	730
30	73	152	285	590
40	63	130	245	500
50	56	115	215	440
60	50	105	195	400
70	46	96	180	370
80	43	90	170	350
90	40	84	160	320
100	38	79	150	305

Maximum capacity of pipe in cubic feet of gas per hour. (Based upon a pressure drop of 0.3 inch water column and 0.6 specific gravity gas).

NOTE: Compounds used on threaded joints of gas piping shall be resistant to the action of liquefied petroleum gases.

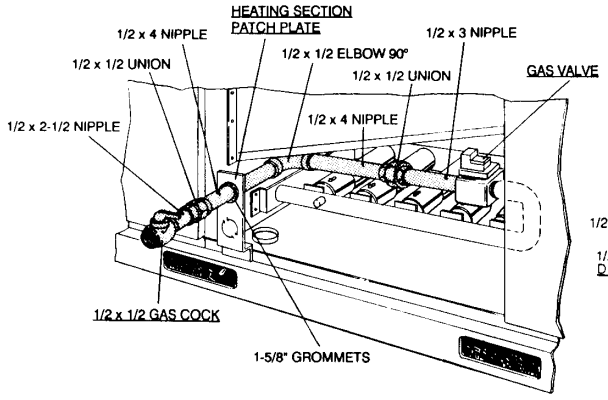


FIG. 4 - EXTERNAL SUPPLY CONNECTION EXTERNAL SHUT-OFF

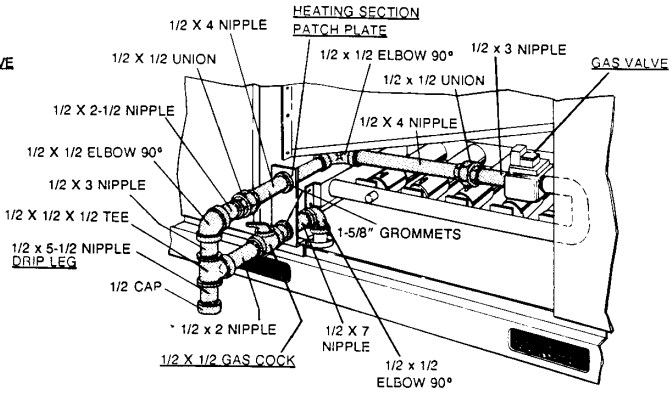

HEATING SECTION PATCH PLATE
1/2 X 4 NIPPLE
1/2 x 1/2 ELBOW 90°
1/2 x 3 NIPPLE
1/2 X 1/2 UNION
1/2 x 1/2 UNION
GAS VALVE
1/2 X 2-1/2 NIPPLE
1/2 X 4 NIPPLE
1/2 X 1/2 ELBOW 90°
1/2 X 3 NIPPLE
1/2 X 1/2 X 1/2 TEE
1-5/8" GROMMETS
1/2 x 5-1/2 NIPPLE DRIP LEG
1/2 CAP
1/2 x 2 NIPPLE
1/2 X 7 NIPPLE
1/2 X 1/2 GAS COCK
1/2 x 1/2 ELBOW 90°

FIG. 5 - BOTTOM SUPPLY CONNECTION EXTERNAL SHUT-OFF

The heating value of the gas may differ with locality. The value should be checked with the local gas utility.

NOTE: There may be a local gas utility requirement specifying a minimum diameter for gas piping. All units require a 1/2 inch pipe connection at the entrance fitting.

GAS CONNECTION

The gas supply line can be routed through the knockouts located on the front of the unit or through the opening provided in the unit's base. Refer to Figure 9 to locate these access openings. Typical supply piping arrangements are shown in Figures 4 and 5. All shaded items are field-supplied.

Two grommets are shipped in the blower compartment (in parts bag taped to the blower housing) of every unit with gas heat and should be used in the knockouts when the gas piping penetrates the front of the unit.

After the gas supply piping has been installed, the bottom opening should be sealed to prevent water from leaking into the building.

Gas piping recommendations:

1. A drip leg and a ground joint union must be installed in the gas piping.
2. When required by local codes, a manual shut-off valve may have to be installed outside of the unit.
3. Use wrought iron or steel pipe for all gas lines. Pipe compound should be applied sparingly to male threads only.

WARNING: Natural gas may contain some propane. Propane, being an excellent solvent, will quickly dissolve white lead or most standard commercial compounds. Therefore, a special pipe compound must be applied when wrought iron or steel pipe is used. Shellac base compounds such as Gaskolac or Stalastic, and compounds such as Rectorseal #5, Cyde's or John Crane may be used.

4. All piping should be cleaned of dirt and scale by hammering on the outside of the pipe and blowing out the loose dirt and scale. Before initial start-up, be sure that all of the gas lines external to the unit have been purged of air.
5. The gas supply should be a separate line and installed in accordance with all safety codes as prescribed under "Limitations". After the gas connections have been completed, open the main shut-off valve admitting *normal gas pressure* to the mains. Check all joints for leaks with soap solution or other material suitable for the purpose. NEVER USE A FLAME.
6. The furnace and its individual manual shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psig (3.48kPa).

   The furnace must be isolated from the gas supply piping system by closing its individual manual shut-off valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psig (3.48kPa).
7. A 1/8 inch NPT plugged tapping, accessible for test gage connection, must be installed immediately upstream of the gas supply connection to the furnace.

L.P./PROPANE UNITS, TANKS AND PIPING

All gas heat units are shipped from the factory equipped for natural gas use only. The unit may be converted in the field for use with L.P./propane gas with accessory kit model number 1NP0434..

All L.P./propane gas equipment must conform to the safety standards of the National Fire Protection Association.

For satisfactory operation, L.P./propane gas pressure must be 10.5 inch W.C at the unit under full load. Maintaining proper gas pressure depends on three main factors:

1. The vaporization rate which depends on (a) the temperature of the liquid and (b) the "wetted surface" area of the container or containers.
2. The proper pressure regulation. (Two-stage regulation is recommended from the standpoint of both cost and efficiency.)
3. The pressure drop in the lines between regulators and between the second stage regualtor and the appliance. Pipe size required will depend on the length of the pipe run and the total load of all appliances.

Complete information regarding tank sizing for vaporization, recommended regulator settings, and pipe sizing is available from most regulator manufacturers and L.P./propane gas suppliers.

L.P./propane gas is an excellent solvent and special pipe compound must be used when assembling piping for this gas as it will quickly dissolve white lead or most standard commercial compounds. Shellac base compunds such as Rectorseal #5 are satisfactory for this type of gas.

Check all connections for leaks when piping is completed, using a soap solution. NEVER USE A FLAME.

LOW NOx APPLICATION

For natural gas heat installations in locations which require low Nitros Oxide emmissions, accessory model 1LN0404 must be installed.

VENT AND COMBUSTION AIR HOODS

The vent and combustion air hoods are shipped attached to the blower housing in the blower compartment. These hoods must be installed on the outside of the gas heat access panel to ensure proper unit function. The necessary mounting screws are provided in a bag also attached to the blower housing.

The screen for the combustion air intake hood is secured to the inside of the access panel opening with three fasteners and the screws used for mounting the hood to the panel. The top flange of this hood slips in under the top of the access panel opening when installing. Refer to Figure 6. Remove the protective label covering the opening just prior to installing this hood.

The vent hood (including its screen) is installed by inserting the top flange of the hood into the slotted opening in the access panel. The top screw secures the hood to the access panel. The remaining two side screws must be installed after the access panel is installed on the unit. These screws engage the bottom flue box flange.

CAUTION: All three screws in the vent hood must be properly installed before furnace operation to insure all combustion products are exhausted from the unit.

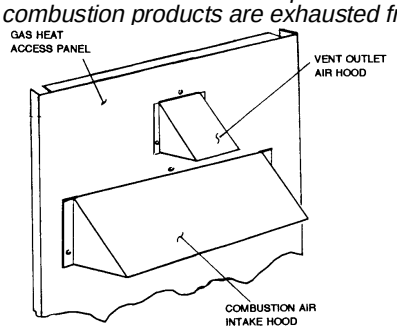


FIG. 6 - VENT AND COMBUSTION AIR HOODS

OPTIONAL ECONOMIZER RAIN HOOD

The following procedure should be used when assembling an economizer rain hood onto a unit. Refer to Figure 7. The outdoor and return air dampers, damper actuator, the linkage and all the controls are factory mounted as part of the economizer option.

All of the hood components, including the filters, the gasketing and the hardware for assembling are located above the top filter racks within the filter section. The outdoor air sensor is in the bag of parts located at the bottom of the return air section.

1. With filter section access panel removed, take out hood components, filters and sensor described above. Remove and discard outdoor air opening cover on back unit (Upper right hand corner).

2. Remove the 1/2" knockout (A) in the units rear panel (located to the right side of the outdoor air opening). Insert the two loose wires from inside the unit, into the 1/2" bushing provided. Insert wires and bushing into knockout. Snap bushing into place.

3. Mount the outdoor air sensor to the rear panel, just below the knockout described in Step 2. Secure with two self-drilling screws at dimples (B) provided in the panel.

NOTE: Sensor must be positioned so that the sensing ports are at the top (louvers pointing downward) and terminal connections to the right.

4. Connect the two wires, indicated in Step 2, to the sensor as follows:
   - Wire #73 to terminal (+)
   - Wire #74 to terminal (S)

5. Assemble the LH and RH side plates to the top cover (2 screws each side) to form the hood. Apply gasketing to the flange surface on each side plate. Extend gasketing 1/4" beyond top and bottom of each flange to insure adequate corner sealing. Secure this assembly to the unit back panel (upper right hand corner). First, remove screw (C) on unit top cover. Then slip flange of hood cover in under flange of unit top cover, replace screw (C), engaging hole (E) in hood flange and tighten. Attach the two side plates to the unit panel by using two self-drilling screws for each side plate at dimples (D) provided in the panel.

6. Position fillpiece at bottom of hood, between the two side plates but do not secure at this time. (Slotted openings MUST be downward for drainage). After fillpiece is properly positioned, note where contact is made with the unit panel. Remove fillpiece and apply gasket material to this area to provide a seal. Reposition fillpiece and secure with 2 screws.

7. Install the two filters into the hood assembly, sliding down along retainers on side plates, into fillpiece at bottom of hood.

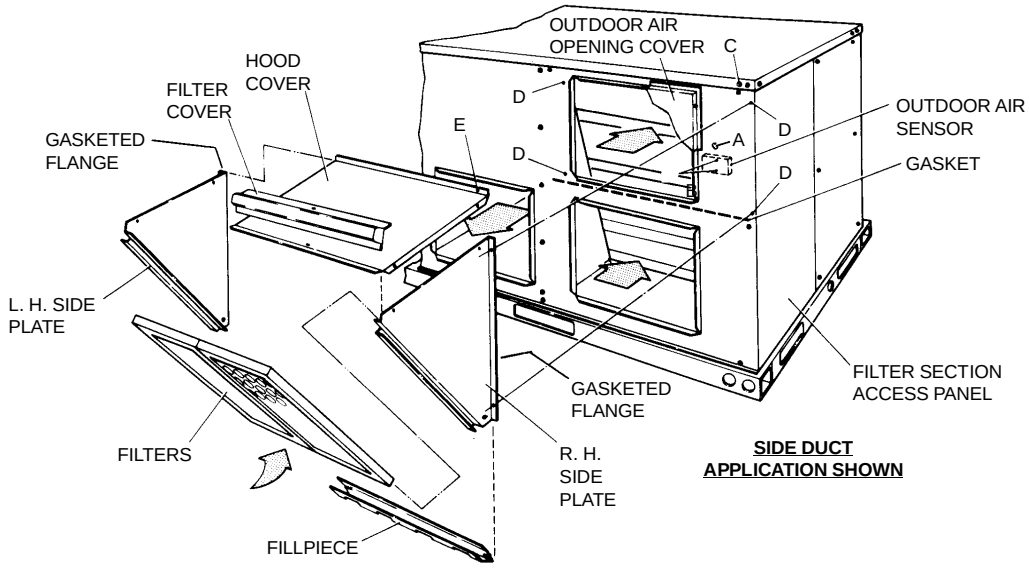


FIG. 7 - ECONOMIZER RAIN HOOD ASSEMBLY (OPTION)

NOTE: Install filters so that "Air Flow" arrows point toward the unit.

8. Install filter cover over the end of the hood with one screw (center of hood), securing filters into position.

CAUTION: When proceeding with Steps 9 and 10, extreme care must be exercised while turning both the set point and minimum position adjusting screws to prevent twisting them off.

9. The enthalpy set point for the dampers may now be set by selecting the desired set point from graph in Figure 8. For a single enthalpy economizer, carefully turn the set point adjusting screw to the "A", "B", "C" or "D" setting corresponding to the lettered curve. For a dual enthalpy economizer, carefully turn the set point adjusting screw fully clockwise past the "D" setting.

10. To check that the damper blades move smoothly without binding, carefully turn the minimum position adjusting screw fully clockwise and then energize and de-energize terminals "R" to "G". With terminals "R" to "G" energized, turn the minimum position screw counterclockwise until the desired minimum position has been attained.

11. Replace the filter section access panel.

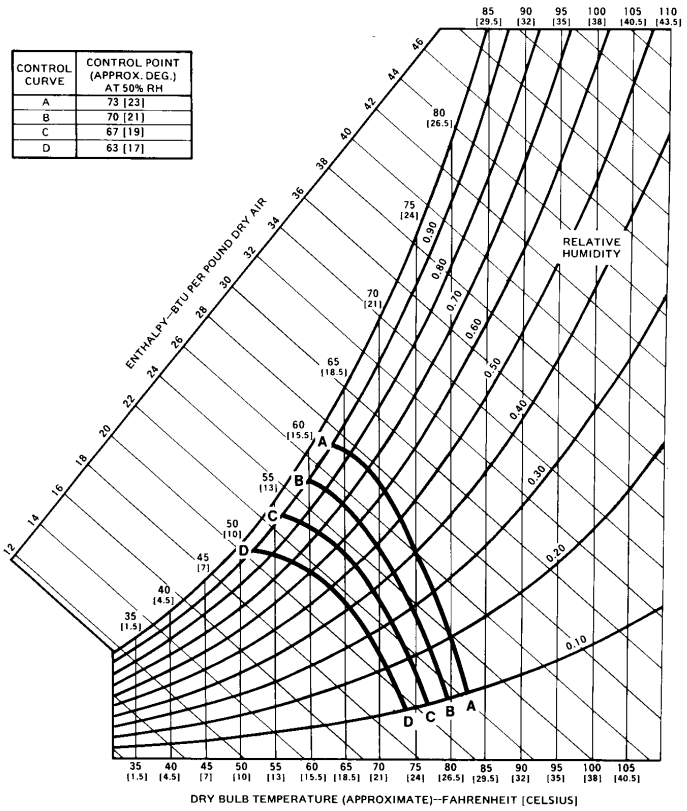


FIG. 8 - ENTHALPY SET POINT ADJUSTMENT

TABLE 4 - PHYSICAL DATA

MODELS		DCG 036	DCG 048	DCG 060	DCG 072
EVAP. BLOWER	CENTRIFUGAL BLOWER (Dia. x Wd. in.)	12 x 10	12 x 10	12 x 10	12 x 11
	FAN MOTOR HP (Direct-Drive)	½	¾	1	1
	FAN MOTOR HP (Belt-Drive)	1	1.5	1.5	1.5
EVAP. COIL	ROWS DEEP	3	3	3	4
	FINS PER INCH	13	13	13	13
	FACE AREA (Sq. Ft.)	3.6	4.3	5.1	5.1
COND. FAN	PROPELLER DIA. (in.)	22	22	22	24
	FAN MOTOR HP	½	½	½	½
	NOM. CFM TOTAL	4,500	4,200	4,500	4,500
COND. COIL	ROWS DEEP	1	1	1	2
	FINS PER INCH	16	19	22	16
	FACE AREA (Sq. Ft.)	17.1	17.1	17.1	16.7
AIR FILTERS (SEE NOTE)	QUANTITY PER UNIT (14" x 20" x 1")	2	2	2	2
	QUANTITY PER UNIT (14" X 25" X 1")	1	1	1	1
	TOTAL FACE AREA (sq. ft.)	6.3	6.3	6.3	6.3
CHARGE	REFRIGERANT 22 (lbs./oz.)	6/0	6/6	7/4	10/3

WEIGHTS (LBS)		
Basic Unit (Nom. Max.)	3 Ton	615
	4 Ton	655
	5 Ton	680
	6 Ton	735

OPTIONS / ACCESSORIES	
Economizer	50
Motorized Outdoor Air Damper	48
Barometric Relief/Fixed Outdoor Air Intake Damper	10
Roof Mounting Curb	92
Belt-Drive Blower	5

NOTE: Filter racks are adapted for 1" or 2" thick filters.

TABLE 5 - SUPPLY AIR PERFORMANCE - 3 Thru 6 Ton w/Direct-Drive Blower

GAS HEAT VALUES SHOWN @ 230/460/575 Volts - Side Duct Connections

MODEL DCG	MOTOR SPEED	Available External Static Pressure - IWG* 0.20 CFM	0.20 Watts	0.30 CFM	0.30 Watts	0.40 CFM	0.40 Watts	0.50 CFM	0.50 Watts	0.60 CFM	0.60 Watts	0.70 CFM	0.70 Watts	0.80 CFM	0.80 Watts	0.90 CFM	0.90 Watts	1.00 CFM	1.00 Watts
036	HI	-	-	-	-	1699	825	1650	785	1570	755	1430	725	1360	700	1280	680	1180	655
	MED	1684	800	1631	780	1582	750	1524	720	1410	690	1324	650	1260	630	1185	610	1100	590
	LOW	1487	710	1464	690	1421	670	1367	650	1315	620	1246	605	1185	590	1110	570	1020	545
048	HI	1996	960	1933	936	1868	910	1795	880	1722	845	1635	820	1544	790	1419	765	1300	740
	MED	1804	838	1765	810	1714	785	1650	765	1589	735	1508	705	1407	675	1306	645	1195	625
	LOW	1681	760	1640	738	1604	715	1541	695	1490	670	1416	645	1337	620	1230	595	1120	575
060	HI	2400	1155	2338	1125	2274	1095	2167	1045	2096	1010	1990	980	1887	945	1771	905	1629	855
	MED	2290	1105	2214	1065	2145	1030	2071	990	1990	950	1911	920	1828	885	1724	835	1604	798
	LOW	2150	1020	2100	990	2029	950	1965	910	1905	880	1816	838	1724	800	1644	770	1531	710
072	HI	2461	1480	2402	1440	2361	1395	2260	1350	2178	1305	2101	1260	2000	1205	1914	1155	1830	1110

NOTE: For 208 volts,multiply values by 0.95.

*Includes allowances for a wet evaporator coil, 1" filters and gas fired heat exchangers. Refer to Table 8 for static resistance values on applications other than side duct airflows.

TABLE 6 - SUPPLY AIR PERFORMANCE - 3 & 4 Ton w/Belt-Drive Blower

3 TON - SIDE DUCT CONNECTIONS @ 230/460/575 Volts

MODEL DCG	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
036	1700	835	705	880	745	923	795	969	860	1013	970	-	-	-	-
	1600	811	655	854	695	898	740	942	790	986	840	1029	900	-	-
	1500	782	610	827	650	871	685	917	730	960	775	1003	825	1046	905
	1400	-	-	798	595	844	640	889	680	932	720	975	765	1018	790
	1300	-	-	-	-	816	590	862	635	907	675	951	715	995	750
	1200	-	-	-	-	-	-	834	585	881	630	927	665	970	705
	1100	-	-	-	-	-	-	809	550	855	590	900	625	942	665
	1000	-	-	-	-	-	-	782	510	829	545	872	858	919	625
	900	-	-	-	-	-	-	-	-	797	500	843	540	890	580

MODEL DCG	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.90		1.00		1.10		1.20		1.30		1.40		1.50	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
036	1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1600	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1500	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1400	1055	875	-	-	-	-	-	-	-	-	-	-	-	-
	1300	1036	780	1066	850	-	-	-	-	-	-	-	-	-	-
	1200	1011	735	1047	765	1075	800	-	-	-	-	-	-	-	-
	1100	987	690	1028	720	1060	750	1084	775	-	-	-	-	-	-
	1000	963	655	1005	680	1040	695	1068	715	1089	735	-	-	-	-
	900	936	615	980	645	1020	660	1050	670	1053	680	1090	690	-	-

NOTE: FOR 208 VOLTS, MULTIPLY VALUES BY 0.95.

*INCLUDES ALLOWANCES FOR A WET EVAPORATOR COIL, 1" FILTERS, AND GAS-FIRED HEAT EXCHANGERS. REFER TO TABLE 8 FOR RESISTANCE VALUES ON CONNECTIONS OTHER THAN SIDE DUCT AIRFLOWS.

4 TON - SIDE DUCT CONNECTIONS @ 230/460/575 Volts

MODEL DCG	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
048	2000	843	860	880	925	919	1005	956	1065	993	1145	1030	1195	1067	1235
	1900	817	775	854	850	893	920	930	995	970	1065	1008	1125	1046	1170
	1800	790	700	828	760	867	840	906	905	944	980	985	1040	1025	1100
	1700	-	-	802	670	840	745	881	815	920	900	961	970	1001	1030
	1600	-	-	-	-	818	665	858	740	898	820	940	890	980	950
	1500	-	-	-	-	-	-	842	695	882	755	922	835	962	895
	1400	-	-	-	-	-	-	833	650	867	705	904	765	942	820
	1300	-	-	-	-	-	-	-	-	858	665	893	725	932	785
	1200	-	-	-	-	-	-	-	-	847	640	880	680	916	730

MODEL DCG	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.90		1.00		1.10		1.20		1.30		1.40		1.50	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
048	2000	1103	1270	-	-	-	-	-	-	-	-	-	-	-	-
	1900	1085	1210	-	-	-	-	-	-	-	-	-	-	-	-
	1800	1064	1145	1102	1180	-	-	-	-	-	-	-	-	-	-
	1700	1040	1075	1081	1115	1121	1140	-	-	-	-	-	-	-	-
	1600	1020	1005	1060	1050	1100	1085	-	-	-	-	-	-	-	-
	1500	1003	945	1044	995	1086	1035	-	-	-	-	-	-	-	-
	1400	982	880	1024	920	1067	965	1107	1000	-	-	-	-	-	-
	1300	970	835	1010	870	1053	920	1099	960	-	-	-	-	-	-
	1200	953	780	992	815	1034	855	1080	905	-	-	-	-	-	-

NOTE: FOR 208 VOLTS, MULTIPLY VALUES BY 0.95.

*INCLUDES ALLOWANCES FOR A WET EVAPORATOR COIL, 1" FILTERS, AND GAS-FIRED HEAT EXCHANGERS. REFER TO TABLE 8 FOR RESISTANCE VALUES ON CONNECTIONS OTHER THAN SIDE DUCT AIRFLOWS.

TABLE 7 - SUPPLY AIR PERFORMANCE - 5 & 6 Ton w/Belt-Drive Blower

5 TON - SIDE DUCT CONNECTIONS @ 230/460/575 Volts

MODEL DCG	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
060	2500	1059	1560	1077	1590	1095	1630	1114	1650	1134	1660	1158	1685	1181	1720
	2400	1032	1405	1054	1470	1074	1525	1094	1560	1116	1595	1140	1620	1167	1640
	2300	1005	1260	1024	1275	1049	1370	1069	1440	1090	1475	1116	1505	1142	1535
	2200	980	1160	1002	1170	1022	1190	1044	1250	1066	1350	1090	1410	1117	1440
	2100	930	1060	957	1070	983	1080	1010	1100	1039	1160	1064	1260	1092	1340
	2000	877	950	908	975	941	1000	976	1020	1009	1050	1040	1100	1070	1225
	1900	-	-	-	-	894	885	940	940	980	980	1014	1020	1047	1095
	1800	-	-	-	-	855	815	903	860	950	905	988	940	1022	970
	1700	-	-	-	-	-	-	884	815	925	850	964	880	1001	910
	1600	-	-	-	-	-	-	864	770	908	805	948	835	987	870
	1500	-	-	-	-	-	-	-	-	882	740	926	780	965	830

MODEL DCG	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.90		1.00		1.10		1.20		1.30		1.40		1.50	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
060	2500	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2400	1193	1665	-	-	-	-	-	-	-	-	-	-	-	-
	2300	1170	1580	1202	1620	-	-	-	-	-	-	-	-	-	-
	2200	1148	1480	1180	1530	-	-	-	-	-	-	-	-	-	-
	2100	1121	1385	1155	1425	1190	1475	-	-	-	-	-	-	-	-
	2000	1100	1285	1133	1340	1169	1385	1205	1445	-	-	-	-	-	-
	1900	1079	1180	1110	1240	1143	1280	1178	1330	1222	1375	-	-	-	-
	1800	1058	1060	1090	1135	1122	1190	1158	1240	1196	1295	-	-	-	-
	1700	1035	960	1071	1030	1103	1100	1134	1140	1164	1175	1197	1205	-	-
	1600	1020	900	1056	965	1088	1035	1118	1065	1145	1105	1170	1130	1198	1150
	1500	1004	860	1038	880	1070	925	1101	980	1130	1045	1158	1075	1184	1110

NOTE: FOR 208 VOLTS, MULTIPLY VALUES BY 0.95.

*INCLUDES ALLOWANCES FOR A WET EVAPORATOR COIL, 1" FILTERS, AND GAS-FIRED HEAT EXCHANGERS. REFER TO TABLE 8 FOR RESISTANCE VALUES ON CONNECTIONS OTHER THAN SIDE DUCT AIRFLOWS.

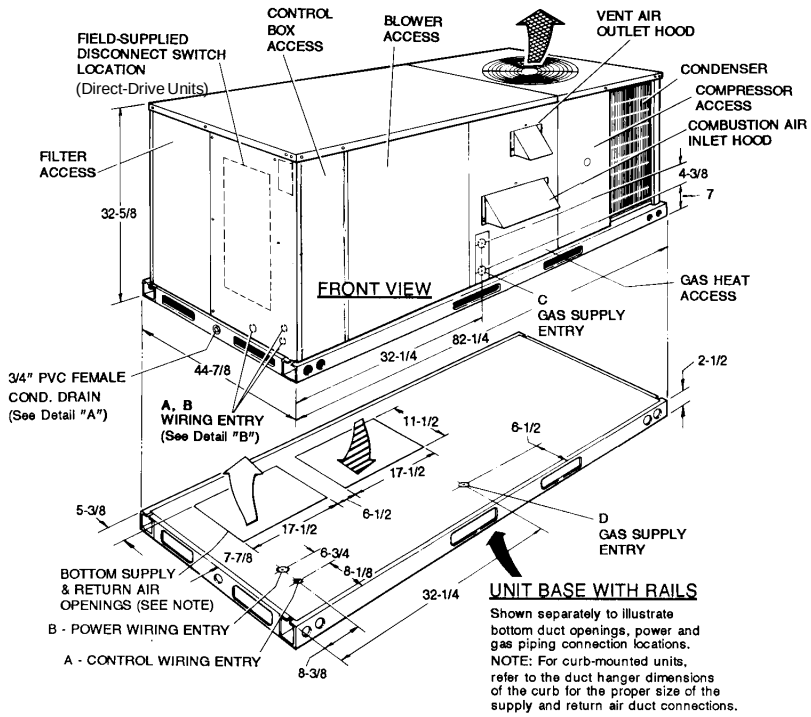
6 TON - SIDE DUCT CONNECTIONS @ 230/460/575 Volts

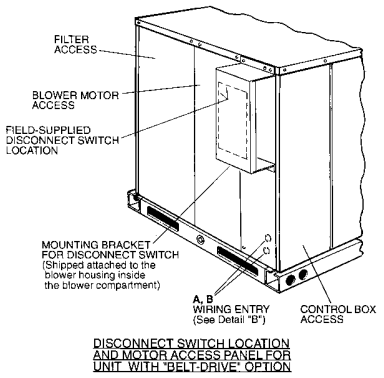
MODEL DCG	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.20		0.30		0.40		0.50		0.60		0.70		0.80	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
072	3200	1150	2325	1182	2425	1212	2525	-	-	-	-	-	-	-	-
	3000	1100	2010	1129	2090	1157	2150	1185	2225	1215	2290	1242	2360	-	-
	2800	1045	1700	1074	1780	1102	1850	1131	1940	1160	2025	1190	2075	1217	2130
	2600	985	1425	1015	1475	1045	1540	1075	1630	1103	1715	1135	1760	1163	1825
	2400	930	1240	958	1300	990	1350	1020	1400	1051	1430	1081	1490	1111	1600
	2200	-	-	905	1070	933	1160	965	1210	997	1250	1028	1285	1060	1325
	2000	-	-	-	-	-	-	919	1025	950	1100	982	1130	1014	1160
	1800	-	-	-	-	-	-	-	-	909	925	939	1005	968	1030

MODEL DCG	AIR FLOW CFM	Available External Static Pressure - IWG*													
		0.90		1.00		1.10		1.20		1.30		1.40		1.50	
		RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
072	3200	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2800	1245	2190	-	-	-	-	-	-	-	-	-	-	-	-
	2600	1193	1920	1222	1990	1250	2060	-	-	-	-	-	-	-	-
	2400	1142	1675	1173	1730	1205	1800	1234	1885	-	-	-	-	-	-
	2200	1090	1380	1124	1450	1155	1550	1186	1640	1217	1710	1249	1775	-	-
	2000	1045	1175	1077	1200	1109	1275	1140	1360	1170	1460	1205	1545	1235	1600
	1800	998	1050	1028	1060	1058	1060	1087	1075	1118	1150	1148	1250	1176	1360

NOTE: FOR 208 VOLTS, MULTIPLY VALUES BY 0.95.

*INCLUDES ALLOWANCES FOR A WET EVAPORATOR COIL, 1" FILTERS, AND GAS-FIRED HEAT EXCHANGERS. REFER TO TABLE 8 FOR RESISTANCE VALUES ON CONNECTIONS OTHER THAN SIDE DUCT AIRFLOWS.




FILTER ACCESS
BLOWER MOTOR ACCESS
FIELD-SUPPLIED DISCONNECT SWITCH LOCATION
MOUNTING BRACKET FOR DISCONNECT SWITCH (Shipped attached to the blower housing inside the blower compartment)
A, B WIRING ENTRY (See Detail "B")
CONTROL BOX ACCESS

DISCONNECT SWITCH LOCATION AND MOTOR ACCESS PANEL FOR UNIT WITH "BELT-DRIVE" OPTION

DUCT COVERS - Units are shipped with all air duct openings covered.

For side duct applications;

1. Remove and discard the supply and return air duct covers.
2. Connect ductwork to duct flanges on the rear of the unit.

For bottom duct applications;

1. Remove the side supply air duct cover to gain access to the bottom supply air knockout panel.
2. Remove and discard the bottom knockout panel.
3. Replace the side duct cover.
4. With filter section access panel removed from the unit, remove and discard the bottom return air knockout panel.
5. Replace the filter access panel.

CLEARANCES

Front	32"
Back	12" (Less Economizer) 36" (With Economizer)
Left Side (Filter Access)	24" (Less Economizer) 36" (With Economizer)
Right Side (Cond. Coil)	24"
Below Unit[1]	0"
Above Unit[2]	72" (For Condenser Air Discharge)

[1] Units may be installed on combustible floors made from wood or class A, B or C roof covering material (Applicable in the USA only).

[2] Units must be installed oudoors. Overhanging structures or shrubs should not obstruct the outdoor coil nor the fan outlet.

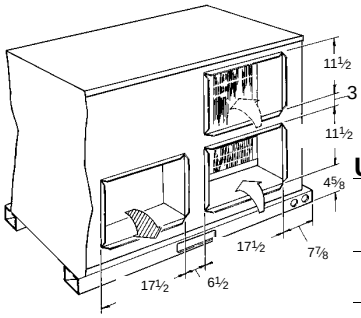
NOTE: A 1" clearance must be provided between any combustible material and the supply air ductwork for a distance of 3 feet from the unit.

The products of combustion must not be allowed to accumulate within a confined space and recirculate.

Locate unit so that the vent air outlet hood is at least:

- Three (3) feet above any forced air inlet located within 10 horizontal feet (excluding those integral to the unit).
- Four (4) feet below, 4 horizontal feet from, or 1 foot above any door or gravity air inlet into the building.
- Four (4) feet from electric meters, gas meters, regulators and relief equipment.

All dimensions are in inches. They are subject to change without notice. Certified dimensions will be provided upon request.



REAR VIEW

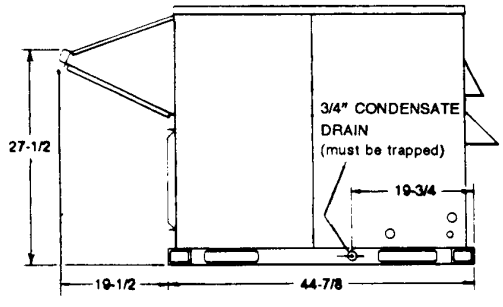
SIDE SUPPLY AND RETURN

UTILITIES ENTRY DATA

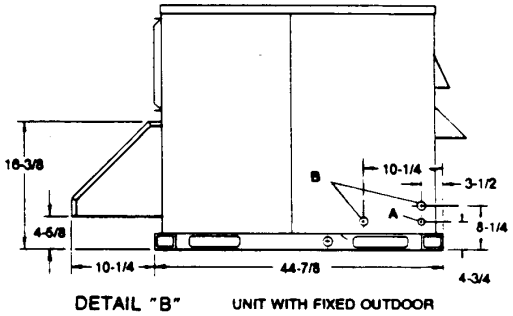
HOLE	KNOCKOUT SIZE (DIA.)	USED FOR
A	7/8" *	Control Wiring (Side or Bottom)**
B	2" *	Power Wiring (Side or Bottom)
C	1-5/8"	Gas Piping (Front)
D	1-1/2"	Gas Piping (Bottom)

*Knockouts in the bottom of the unit can be located by the slice in the insulation.

**Do not remove the 2" knockout ring.



DETAIL "A" UNIT WITH ECONOMIZER RAIN HOOD



DETAIL "B" UNIT WITH FIXED OUTDOOR AIR / BAROMETRIC RELIEF RAIN HOOD

AIR FLOW LEGEND

- RETURN AIR
- SUPPLY AIR
- OUTDOOR AIR
- OUTDOOR AIR (Economizer)

FIG. 9 - DIMENSIONS AND CLEARANCE (3, 4, 5 & 6 TON)

TABLE 8 - STATIC RESISTANCES

DESCRIPTION	EXTERNAL STATIC PRESSURE DROP RESISTANCE, IWG CFM										
	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000
Economizer/Motorized Damper[1, 2]	0.07	0.08	0.09	0.11	0.13	0.15	0.17	0.20	0.23	0.26	0.30
Bottom Duct Connections[1]	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.14	0.16	0.19	0.22

[1]Deduct these resistance values from the available external static pressure shown in the respective Blower Performance Table.
[2]The pressure thru the economizer is greater for 100% outdoor air than for 100% return air. If the resistance of the return air duct system is less than 0.25 IWG, the unit will deliver less CFM during full economizer operation.

TABLE 9 - MOTOR AND DRIVE DATA - Belt-Drive Blower

MODEL	BLOWER RANGE (RPM)	MOTOR*				ADJUSTABLE MOTOR PULLEY		FIXED BLOWER PULLEY		BELT	
		HP	RPM	FRAME SIZE	SERVICE FACTOR	PITCH DIA. (in.)	BORE (in.)	PITCH DIA. (in.)	BORE (in.)	PITCH LENGTH (in.)	DESIG-NATION
DCG 036	780 - 1090	1	1100	48	-	2.4 - 3.4	5/8	3.5	1	33.3	A32
DCG 048	790 - 1120	1-1/2	1725	56	1.15	2.4 - 3.4	7/8	5.7	1	37.3	A36
DCG 060	850 - 1220	1-1/2	1725	56	1.15	2.4 - 3.4	7/8	5.2	1	37.3	A36
DCG 072	900 - 1250	1-1/2	1725	56	1.15	2.8 - 3.8	7/8	5.2	1	37.3	A36

*All motors have solid bases and are inherently protected. These motors can be selected to operate into their service factor because they are located in the moving air, upstream of any heating device.

TABLE 10 - ELECTRICAL DATA (BASIC UNIT) w/ Direct-Drive Blower Motor

MODEL DCG	POWER SUPPLY	VOLTAGE LIMITATIONS (SEE NOTE 1)		COMPRESSOR		COND. FAN MOTOR, FLA	SUPPLY AIR BLOWER MOTOR, FLA	TOTAL UNIT AMPACITY, AMPS	MAX. FUSE SIZE, (SEE NOTE 2) AMPS	MAX. HACR BREAKER SIZE, AMPS	MIN. WIRE SIZE, AWG (SEE NOTE 3)
		MIN.	MAX.	RLA	LRA						
036	208/230-1-60	187	253	19.2	87	2.3	4.4	30.7	45	45	8
	208/230-3-60	187	253	14.1	110	2.3	4.4	24.3	35	35	10
	460-3-60	414	504	7.1	54	1.4	2.0	12.5	15	15	14
	575-3-60	518	630	5.8	44	1.4	2.0	10.9	15	-	14
048	208/230-1-60	187	253	23.1	105	2.3	5.0	36.2	50	50	8
	208/230-3-60	187	253	14.7	130	2.3	5.0	25.7	40	40	10
	460-3-60	414	504	7.1	64	1.4	2.2	12.5	15	15	14
	575-3-60	518	630	6.4	52	1.4	2.2	11.6	15	-	14
060	208/230-1-60	187	253	28.2	135	2.3	6.6	44.2	70	70	6
	208/230-3-60	187	253	16.7	150	2.3	6.6	29.8	45	45	10
	460-3-60	414	504	9.6	73	1.4	3.3	16.7	25	25	10
	575-3-60	518	630	8.3	59	1.4	3.3	15.1	20	-	12
072	208/230-3-60	187	253	20.7	156	2.3	6.8	35.0	50	50	8
	460-3-60	414	504	10.0	70	1.4	3.6	17.5	25	25	10
	575-3-60	518	630	8.2	54	1.4	3.6	15.3	20	-	12

NOTES:1. Utilization Range "A" in accordance with ARI Standard 110.
2. Dual element, time delay type.
3. Based on 60°C copper conductors.

TABLE 11 - ELECTRICAL DATA (BASIC UNIT) w/ Belt-Drive Blower Motor

MODEL DCG	POWER SUPPLY	VOLTAGE LIMITATIONS (SEE NOTE 1)		COMPRESSOR		COND. FAN MOTOR, FLA	SUPPLY AIR BLOWER MOTOR, FLA	TOTAL UNIT AMPACITY, AMPS	MAX. FUSE SIZE, (SEE NOTE 2) AMPS	MAX. HACR BREAKER SIZE, AMPS	MIN. WIRE SIZE, AWG (SEE NOTE 3)
		MIN.	MAX.	RLA	LRA						
036	208/230-1-60	187	253	19.2	87	2.3	5.3	31.6	45	45	8
	208/230-3-60	187	253	14.1	110	2.3	5.3	25.2	35	35	10
	460-3-60	414	504	7.1	54	1.4	3.1	13.4	20	20	12
	575-3-60	518	630	5.8	44	1.4	3.1	11.8	15	-	14
048	208/230-1-60	187	253	23.1	105	2.3	8.6	39.5	50	50	8
	208/230-3-60	187	253	14.7	130	2.3	5.2	25.9	40	40	10
	460-3-60	414	504	7.1	64	1.4	2.6	12.9	15	15	14
	575-3-60	518	630	6.4	52	1.4	2.0	11.4	15	-	14
060	208/230-1-60	187	253	28.2	135	2.3	8.6	46.2	70	70	8
	208/230-3-60	187	253	16.7	150	2.3	6.0	29.2	45	45	10
	460-3-60	414	504	9.6	73	1.4	3.0	16.4	25	25	10
	575-3-60	518	630	8.3	59	1.4	2.4	14.2	20	-	12
072	208/230-3-60	187	253	20.7	156	2.3	7.3	35.5	50	50	8
	460-3-60	414	504	10.0	70	1.4	3.7	17.6	25	25	10
	575-3-60	518	630	8.2	54	1.4	2.8	14.5	20	-	12

NOTES: 1. Utilization Range "A" in accordance with ARI Standard 110.
2. Dual element, time delay type.
3. Based on 60°C copper conductors.

OPERATION

COOLING SYSTEM

The cooling section is a complete factory package utilizing an air-cooled condenser. The system is factory-charged with Refrigerant-22.

The compressor is hermetically sealed and internally sprung. The compressors have inherent (internal) protection. If there is an abnormal temperature rise in the compressor, the protector will open to shut down the compressor.

PRELIMINARY OPERATION COOLING

After the installation has been completed, energize the crankcase heater for at least 4 hours before operating the unit. After this initial warm-up, the compressor should be given three false starts (energized just long enough to make a few revolutions) with a 5 minute delay between each start before being put into full time service.

NOTE: Prior to each cooling season, the crankcase heater must be energized at least 10 hours before the system is put into operation.

COOLING SEQUENCE OF OPERATION

Single-Stage Cooling: When the thermostat calls for “cooling”, “R” is closed to “G” and “Y1" (wiring schematic) which completes the low voltage control circuit, immediately energizing the compressor, condenser fan motor and blower motor simultaneously.

Two-Stage Cooling: A two-stage cooling thermostat may be used if the unit has an economizer. First-stage cooling is provided by the economizer - if the outdoor air enthalpy is acceptable, and second-stage cooling is provided by the compressor. Jumper wire J1 must be removed. Refer to the unit wiring diagram.

After the thermostat is satisfied and opens, all components will stop simultaneously.

CONTINUOUS BLOWER - Continuous blower operation is possible by closing the R to G circuit on the thermostat.

SAFETY CONTROLS (Cooling)

The refrigerant system is equipped with the following safety controls:

1. A Suction Line Freezestat to protect aginst low evaporator temperatures due to a low air flow or a low return air temperature.
2. A High Pressure Cutout Switch to protect against excessive discharge pressures due to a blocked condenser coil or a condenser motor failure.
3. A Low Pressure Switch to protect against loss of refrigerant charge.

If either one of the above safety controls opens, the refrigerant system will bo locked out. The lock out of the system can be reset by opening the 24V circuit either at the room thermostat or at the unit disconnect.

HEATING SEQUENCE OF OPERATION

The following sequence describes the operation of the gas heat section.

CONTINUOUS BLOWER: With the room thermostat switch set to “ON”, the supply air blower will operate continuously. The normally closed blower interlock relay contact “K3-1" provides 24 volt power to the blower relay ”BR". The “BR” power contacts close and the blower motor operates.

INTERMITTENT BLOWER: With the room thermostat system switch set to the “AUTO” or “HEAT” position and the fan switch set to “AUTO”, the supply air blower will operate after the room thermostat calls for heat and the air in the gas heat compartment has achieved a pre-set temeprature.

When “TH1" on the thermostat closes, the draft motor relay ”DMR" is energized. The “DMR” power contacts close which energizes the line voltage draft motor. As the speed of the draft motor reaches approximately 2500 RPM, the centrifugal switch contact “CS” located on the end of the draft motor shaft closes to power the ignition control “IC”.

After 15 seconds, the "IC" will start the ignitor sparking and will open the redundant valve locted inside the main gas valve “GV” to allow a flow of gas to only the carryover tube. See Figure 10. Only after the pilot flame has been ignited and the presence of pilot flame detected at the “IC” by a signal sent back through the flame sensor is sparking terminated and the main gas valve opened.

Gas flows into each of the main burners and is ignited from the carryover tube flame.

The "IC" will try for 85 seconds to ignite the pilot carryover tube. If the "IC" fails to detect a pilot flame during the 85 seconds, it will close the redundant valve. After a 5 minute purge period, the "IC" will again try to light the pilot carryover tube. This will continue continuously until the "IC" detects a pilot flame.

If, after detecting a pilot flame and opening the main gas valve, the "IC" looses pilot flame indication, it will close both the main and redundant gas valves. The "IC" will start the above sequence over until a pilot flame is detected and it will open the main gas valve again.

The "IC" will only allow 16 pilot flameouts and a single rollout switch opening per thermostat cycle. After 16 pilot flameouts or a single rollout switch opening, the "IC" closes both the main and redundant gas valves. The "IC" requires resetting the thermostat or removal of it’s power lead coming from the draft motor to reset the "IC" and return it to the above sequence of operation.

At the same time power was supplied to the “DMR”, a parallel circuit activates the time delay relay (TDR). The “TDR” closes in approximetly 35 seconds and starts the circulating air blower by energizing the blower interlock relay “K3", thus closing the ”K3-2" contact and energizing the blower relay “BR”.

When the heating cycle is complete, “TH-1" opens de-energizing the “IC”, thus closing the redundant and main gas valves. The blower motor and the draft motor continue to run for a short period after the furnace is shut down until the “TDR” opens (in approximately 30 seconds) de-energizing the “K3", ”BR" and "DMR" relays.

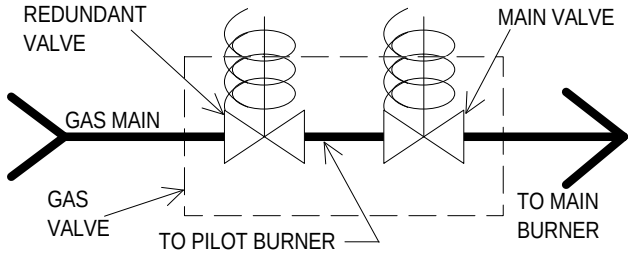


FIG. 10 - GAS VALVE PIPING

SAFETY CONTROLS (Heating)

The control circuit includes the following safety controls:

1. Limit Control (LS). This control is located inside the heat exchanger compartment and is set to open at the temperature indicated in Table 12. It resets automatically. The limit switch, operates when a high temperature condition, caused by inadequate supply air flow occurs, thus shutting down the ignition control and closing the main gas valve.

TABLE 12 - LIMIT CONTROL SETTING

Units (Tons)	Capacity, MBH		Limit Control Opens, °F
	Input	Output	
3	50	40	165
4	75	60	165
3	100	79	165
4	125	99	165
5	100	79	165
5	125	99	165
6	100	79	165
6	125	99	165

2. Centrifugal Switch (CS-36). If the draft motor should fail, the centrifugal switch attached to the shaft of the motor prevents the ignition control and gas valve from being energized.

3. Redundant Gas Valve. This valve is an integral part of the main gas valve and is located up stream of the main gas valve. Should the main gas valve fail in the open position the redundant valve serves as a back up and shuts off the flow of gas.

4. Flame Sensor Rod. This sensor rod is located on the far side of the carryover tube. If the ignition control does not receive a signal from the flame sensor indicating that the pilot flame has ignited properly, the main gas valve will not open. If the flame sensor fails to detect the pilot flame during operation of the main burners, a signal is sent to the ignition control to close the main gas valve.

5. Rollout Switch. This switch is located in the burner vestibule. In the event of a sustained main burner flame rollout, it shuts off the ignition control and closes the main gas valve.

HEAT ANTICIPATOR SETPOINTS

The anticipator must be set correctly. Too high of a setting will result in longer heat cycles and a greater temperature swing in the conditioned space.

Reducing the value below the correct setpoint will give shorter “ON” cycles and may result in the lowering of the temperature within the conditioned space.

Gas Valve	Anticipator Setpoint
Honeywell VR8204M	0.60 amp
White-Rodgers 36E36	0.54 amp

PRE-START CHECK LIST

Complete the following checks before starting the unit.

1. Check the type of gas being supplied. Be sure that it is the same as listed on the unit nameplate.
2. Make sure that the vent and combustion air hoods have been properly installed.

START-UP

OPERATING INSTRUCTIONS

CAUTION: This furnace is equipped with an intermittent pilot and automatic re-ignition system. DO NOT attempt to manually light the pilot.

TO LIGHT PILOT AND MAIN BURNERS:

1. Turn “off” electric power to unit.
2. Turn room thermostat to lowest setting.
3. Turn gas valve knob to “on” position.
4. Turn “on” electric power to unit.
5. Set room thermostat to desired temperature. (If thermostat “set” temperature is above room temperature, pilot burner ignition will occur and, after an interval to prove pilot flame, main burners will ignite).

TO SHUT DOWN:

1. Turn “off” electric power to unit.
2. Depress knob of gas valve while turning to “off” position.

POST-START CHECK LIST (GAS)

After the entire control circuit has been energized and the heating section is operating, make the following checks:

1. Check for gas leaks in the unit piping as well as the supply piping.
2. Check for correct manifold gas pressures. See “Checking Gas Input”.
3. Check the supply gas pressure. It must be within the limits shown on rating nameplate. Supply pressure should be checked with all gas appliances in the building at full fire. At no time should the standby gas line pressure exceed 13", nor the operating pressure drop below 4.5" for natural gas units. If gas pressure is outside these limits, contact the local gas utility for corrective action.

MANIFOLD GAS PRESSURE ADJUSTMENT

Small adjustments to the high-fire gas flow may be made by turning the pressure regulator adjusting screw on the automatic gas valve. Refer to Figure 11.

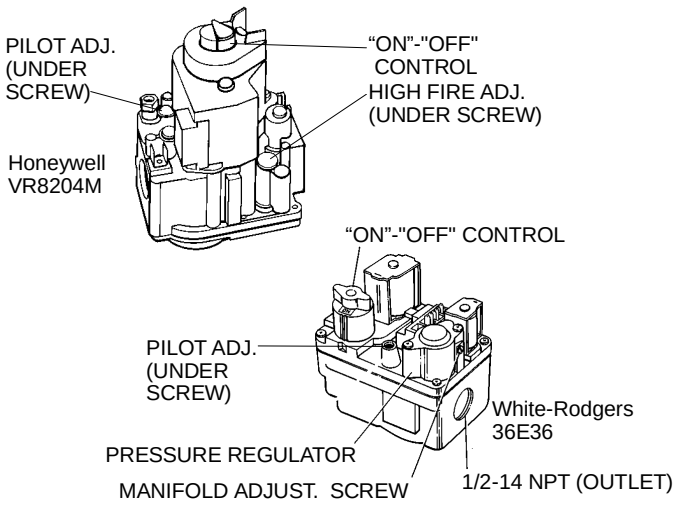


FIG. 11 - GAS VALVES

Adjust as follows:

1. Remove the cap on the regulator. (High Fire adjusting screw on valve).
2. To decrease the gas pressure, turn the adjusting screw *counterclockwise.*
3. To increase the gas pressure, turn the adjusting screw *clockwise*.

NOTE: Check the rating/orifice data label on the blower access panel for the proper manifold pressure of the furnace.

PILOT CHECKOUT

The pilot flame should envelope 3/8 inches of the end of the flame sensor. Refer to Figure 12. To adjust pilot flame, (1) remove pilot adjustment cover screw, (2) adjust the screw for the proper pilot flame, (3) be sure to replace cover screw after adjustment to prevent possible gas leakage.

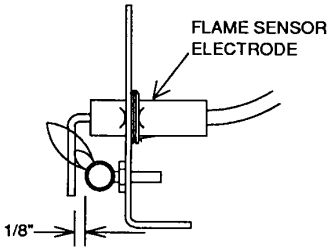


FIG. 12 - PROPER FLAME ADJUSTMENT

Put the system into operation and observe through complete cycle to be sure all controls function properly.

BURNER INSTRUCTIONS

To check or change burners, pilot or orifices, CLOSE MAIN MANUAL SHUT-OFF VALVE AND SHUT OFF ALL POWER TO THE UNIT.

1. Remove the two screws holding either end of the manifold to the burner supports.
2. Open the union fitting in the gas supply line just upstream of the unit gas valve and downstream from the main manual shut-off valve.
3. Remove the gas piping patch plate.
4. Disconnect wiring to the gas valve and spark ignitor. Remove the manifold-burner gas valve assembly by lifting up and pulling back.

Burners are now accessible for service.

Reverse the above procedure to replace the assembly. Make sure that burners are level and seat at the rear of the heat exchanger.

BURNER AIR SHUTTER ADJUSTMENT

Adjust burner shutters so that a distinct, sharp, blue flame is obtained. Refer to Figure 13.

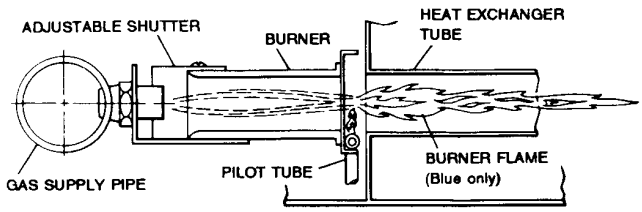


FIG. 13 - TYPICAL FLAME APPEARANCE

SUPPLY AIR BLOWER AND TEMPERATURE RISE ADJUSTMENTS

The speed of the supply air blower will depend on the required CFM, the unit accessories and the static resistances of both the supply and the return air duct systems. With this information, the speed for the supply air blower can be determined from the blower performance and accessory static resistance data in Tables 5 through 8.

Knowing the required blower RPM and the blower motor HP, the speed setting for the supply air motor can be determined.

The setting (turns open) for the optional belt-drive supply air motor pulley can be determined from Table 13.

TABLE 13 - BELT-DRIVE SUPPLY AIR MOTOR PULLEY ADJUSTMENT

TURNS OPEN*	BLOWER DRIVE RANGE (RPM)			
	3 TON	4 TON	5 TON	6 TON
5	780	790	850	900
4	842	856	924	970
3	904	922	998	1040
2	966	988	1072	1110
1	1028	1054	1246	1180
0	1090	1120	1220	1250

*Pulley can be adjusted in half-turn increments.

OPTIONAL BELT-DRIVE BLOWER

All units with belt-drive blowers have single-speed motors. The variable pitch pulley on the blower motor can be adjusted to obtain the desired supply air CFM. Refer to Table 9 for blower motor and drive data. The tension on the belts should be adjusted as shown in Figure 14.

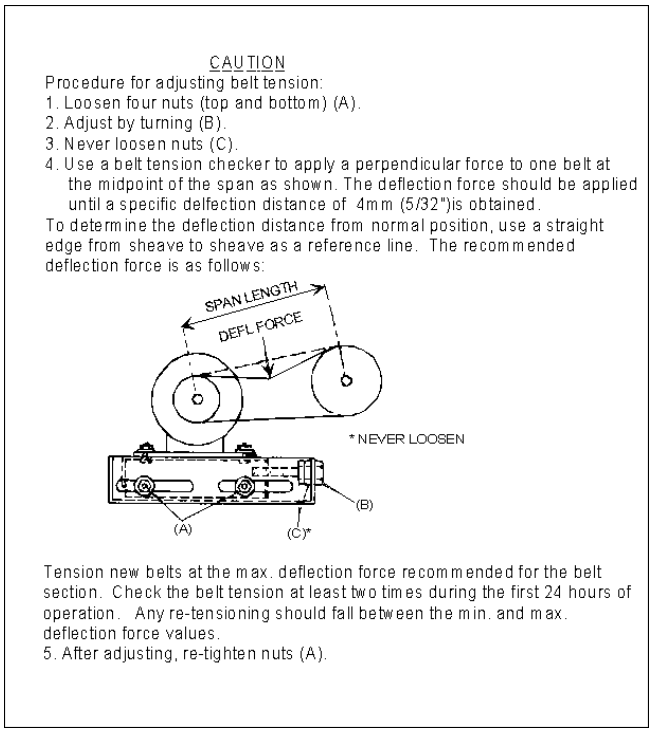

CAUTION
Procedure for adjusting belt tension:
1. Loosen four nuts (top and bottom) (A).
2. Adjust by turning (B).
3. Never loosen nuts (C).
4. Use a belt tension checker to apply a perpendicular force to one belt at the midpoint of the span as shown. The deflection force should be applied until a specific delfection distance of 4mm (5/32")is obtained.
To determine the deflection distance from normal position, use a straight edge from sheave to sheave as a reference line. The recommended deflection force is as follows:
SPAN LENGTH
DEFL FORCE
* NEVER LOOSEN
(A)
(C)*
(B)
Tension new belts at the max. deflection force recommended for the belt section. Check the belt tension at least two times during the first 24 hours of operation. Any re-tensioning should fall between the min. and max. deflection force values.
5. After adjusting, re-tighten nuts (A).

FIG. 14 - BELT ADJUSTMENT

Start the supply air blower motor. Adjust the resistances in both the supply and the return air duct systems to balance the air distribution throughout the conditioned space. The job specifications may require that this balancing be done by someone other than the equipment installer.

To check the supply air CFM after the initial balancing has been completed:

1. Drill two 5/16 inch holes in the side panels as shown in Figure 15, if they are not already supplied at this location.
2. Insert at least 8" of 1/4 inch tubing into each of these holes for sufficient penetration into the air flow on both sides of the evaporator coil.

   NOTE: The tubes must be inserted and held in a position perpendicular to the air flow so that velocity pressure will not affect the static pressure readings.

3. Using an inclined manometer, determine the pressure drop across a dry evaporator coil. Since the moisture on an

evaporator coil may vary greatly, measuring the pressure drop across a wet coil under field conditions would be inaccurate. To assure a dry coil, the compressors should be de-energized while the test is being run.

4. Knowing the pressure drop across a dry coil, the actual CFM through the unit can be determined from the curve in Figure 16.

The temperature rise (or temperature difference between the return air and the heated air from the furnace) must lie within the range shown on the UL or CGA rating plate and the data in Table 2.

If the CFM is above or below the specified value, the supply air motor speed may have to be changed by moving the motor speed tap to another terminal.

$$CFM = \frac{\text{Btuh Input x } 0.8}{1.08 \text{ x } {}^{o}\text{F Temp. Rise}}$$

WARNING: Failure to properly adjust the total system air quantity can result in poor system performance.

After readings have been obtained, remove the tubes and seal up the drilled holes in the side panels. 5/16" dot plugs (P/N 029-13880) are available through normal parts ordering procedures.

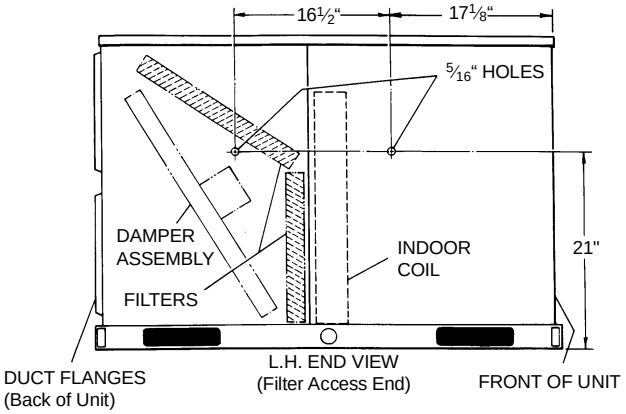


FIG. 15 - HOLE LOCATIONS (PRESS. DROP READINGS)

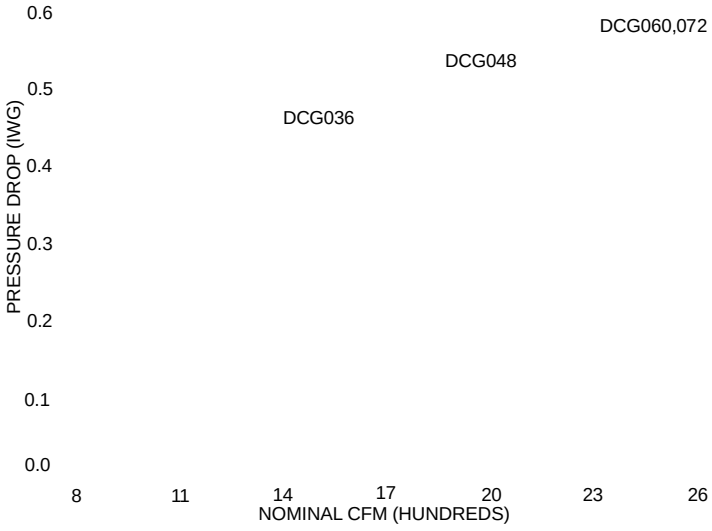


FIG. 16 PRESSURE DROP vs SUPPLY AIR CFM

CHECKING GAS INPUT

NATURAL GAS

1. Turn off all other gas appliances connected to the gas meter.
2. With the furnace turned on, measure the time needed for one revolution of the hand on the smallest dial on the meter. A typical gas meter usually has a 1/2 or a 1 cubic foot test dial.
3. Using the number of seconds for each revolution and the size of the test dial increment, find the cubic feet of gas consumed per hour from Table 14.

If the actual input is not within 5% of the furnace rating (with allowance being made for the permissible range of the regulator setting) replace the orifice spuds with spuds of the proper size.

NOTE To find the Btu input, multiply the number of cubic feet of gas consumed per hour by the Btu content of the gas in your particular locality (contact your gas company for this information - it varies widely from city to city.)

TABLE 14 - GAS RATE - CUBIC FEET PER HOUR

Seconds for One Rev.	Size of Test Dial	
	1/2 cu. ft.	1 cu. ft.
10	180	360
12	150	300
14	129	257
16	113	225
18	100	200
20	90	180
22	82	164
24	75	150
26	69	138
28	64	129
30	60	120
32	56	113
34	53	106
36	50	100
38	47	95
40	45	90
42	43	86
44	41	82
46	39	78
48	37	75
50	36	72
52	35	69
54	34	67
56	32	64
58	31	62
60	30	60

Example: By actual measurement, it takes 38 seconds for the hand on the 1-cubic foot dial to make a revolution with just a 100,000 Btuh furnace running. Using this information, locate 38 seconds in the first column in the table above. Read across to the column headed "1 Cubic Foot", where you will see that 95 cubic feet of gas per hour are consumed by the furnace at that rate. Multiply 95 x 1050 (the Btu rating of the gas obtained from the local gas company). The result is 99,750 Btuh, which is close to the 100,000 Btuh rating of the furnace.

SECURE OWNER'S APPROVAL: *When the system is functioning properly, secure the owner's approval. Show him the location of all disconnect switches and the thermostat. Teach him how to start and stop the unit and how to adjust temperature settings within the limitations of the system.*

MAINTENANCE

NORMAL MAINTENANCE

CAUTION: Prior to any of the following maintenance procedures, shut off all power to the unit to prevent personal injury.

Periodic maintenance normally consists of changing or cleaning filters and (under some conditions) cleaning the main burners.

FILTERS - Inspect once a month. Replace disposable or clean permanent type as necessary. DO NOT replace permanent type with disposable.

MOTORS - Indoor fan and outdoor fan motors are permanently lubricated and require no maintenance. Ventor motor is factory lubricated for an estimated 10 year life.

OUTDOOR COIL - Dirt should not be allowed to accumulate on the outdoor coil surface or other parts in the air circuit. Cleaning should be as often as necessary to keep coil clean. Use a brush, vacuum cleaner attachment, or other suitable means. If water is used to clean coil, be sure power to the unit is shut off prior to cleaning.

NOTE: Exercise care when cleaning the coil so that the coil fins are not damaged.

Do not permit the outdoor air discharge to be obstructed by overhanging structures of shrubs.

BURNER & PILOT - Periodically (at least annually at the beginning of each heating season) make a visual check of the pilot and main burner flame. If necessary, adjust main burner primary air shutters so that no yellow flame is observed as explained under “BURNER AIR SHUTTER ADJUSTMENT”. If it is not possible to adjust for the proper flame, the burners may need cleaning.

TO CLEAN BURNERS - Remove them from the furnace as explained in “Burner Instructions”. Clean burners with hot water applied along top of the burner.

COMBUSTION AIR DISCHARGE - Visually inspect discharge outlet periodically to make sure that the buildup of soot and dirt is not excessive. If necessary, clean to maintain adequate combustion air discharge.

The manufacture recommends that the furnace system be inspected once a year by a qualified service person.

CLEANING FLUE PASSAGES AND HEATING ELEMENTS

With proper combustion adjustment the heating element of a gas fired furnace will seldom need cleaning. If the element should become sooted, it can be cleaned as follows:

1. Remove the burner assembly as outlined in “BURNER INSTRUCTIONS”.
2. Remove the roof over the gas heat section.
3. At the top front of the heat section, remove the screws holding the top of the flue collector box. Carefully remove the top of the flue collector box without ripping the adjacent insulation.
4. Lift out the flue diverter baffle.
5. On the inside of the flue collector box, remove the screws holding the flue baffle. Remove the flue baffle.
6. Using a wire brush on a flexible wand, brush out the inside of each heat exchanger from the burner inlet and flue outlet ends.
7. Brush out the inside of the flue collector box and the flue baffles.
8. Run the wire brush down the vent tube from the flue collector end.
9. If soot build-up is particularly bad, remove the vent motor and clean the wheel and housing. Run the wire brush down the flue extentions at the outlet of the vent housing.
10. After brushing is complete, blow all brushed areas with air or nitrogen. Vacuum as needed.
11. Replace parts in the order they were removed in Steps 1 to 5.
12. When replacing the top of the flue collector box, be careful so as not to tear the adjoining insulation.
13. Assure that all seams on the vent side of the combustion system are air tight. Apply a high temperature (+500°F) sealing compound where needed.

TROUBLESHOOTING

WARNING: Troubleshooting of components necessarily requires opening the electrical control box with the power connected to the unit. Use extreme care when working with live circuits! Check the unit nameplate for the correct line voltage and set the volt meter to the correct range before making any connections with line terminals.

CAUTION: The wire number or color and terminal designations referred to may vary. Check the wiring label inside the control box access panel for the correct wiring.

1. Draft motor operates and furnace lights but supply air blower does not start after a short time delay with room thermostat fan switch set to "AUTO".

   a. Set fan switch to "ON". If blower motor runs, go to Step f. If it does not, check to see if line voltage is being supplied to the contacts of the blower relay, "BR", and if the blower relay is pulled in. Check for loose wiring.

   b. If "BR" is pulled in, touch the supply air blower motor housing. If it is hot the motor may be off on inherent protection. Disconnect power to the unit and check the blower motor capacitor. If it is defective, replace it with one of equal capacitance and voltage.

   c. If "BR" is pulled in and the blower motor still does not run, replace the blower motor.

   d. If "BR" is not pulled in check for 24 volts at the "BR" coil. If 24 volts is present, replace the "BR" relay.

   e. If 24 volts is not present at the "BR" coil, check for loose 24 volt wiring back to the relay board. Check control wiring to the room thermostat. If all is fine, replace the relay board.

   f. If the blower motor runs with the fan switch in the "ON" position but does not run soon after the furnace has ignited with the fan switch in the "AUTO" position, check for loose 24 volt wiring between the relay board in the main control box, the Mate-N-Lok connector in the partition between the evaporator and gas heat sections and the time delay relay (TDR).

   g. If all control wiring is fine, check for 24 volts at the relay board. If 24 volts is present, replace the relay board. If 24 volts is not present, replace the "TDR".

NOTE: The furnace may shut itself down on a high temperature condition during the procedure but this will not effect the test if it is done within 5 minutes of furnace shut-down.

2. The supply air blower operates but the draft motor does not when the room thermostat is set to call for heat and the fan switch in the "ON" position.

   a. The draft motor has inherent protection. If the motor shell is hot to the touch, wait for the internal overload to reset.

   b. If the motor shell is cold with the room thermostat calling for heat, check for line voltage at the motor's Mate-N-Lok connector attached to the evaporator partition. If line voltage is present, replace the draft motor.

   c. If line voltage is not present, check for line voltage at the draft motor relay (DMR) contacts in the main control box and check to see if the "DMR" is pulled in.

   d. If the "DMR" relay is pulled in, check for a loose line voltage connection.

   e. If the "DMR" relay is not pulled in, check for 24 volts at the "DMR" coil. If 24 volts is present, replace the "DMR" relay. If 24 volts is not present, check for a loose 24 volt connection back to the relay board and check the connections from the room thermostat to the relay board. If all connections are correct, replace the relay board.

3. The draft motor runs but the furnace does not light and the sparker does not spark.

   a. Check all 24 volt connections from the relay board to and in the gas heat section. Check low voltage connections to the "TDR" located in the control box.

   b. If the furnace is hot, it may be out on an over temperature condition, wait for limit reset.

   c. If the furnace is cold, check for 24 volts at wire 62 attached to the "TDR" located in the control box. If 24 volts is not found, replace the fan-limit.

   d. If 24 volts is found at wire 62, remove the wires attached to the "TDR" and with a VOM, check for continuity across "TDR". If none is found, the "TDR" is open and must be replaced. If there is continuity, re-attach the wires.

      With the draft motor running, check for 24 volts at terminal 24V on the ignitor control (IC) where the red lead from the draft motor attaches. If 24 volts is not present, the centrifugal switch (CS) has not closed or has gone bad. Check the line voltage to the unit, if it is correct replace the draft motor. If line voltage is low call the power company.

   e. If 24 volts is present at the ignitor control, check all control wiring at the ignitor control and the high tension wire to the ignitor. Check that the greeen ground wires from the ignitor control, the gas valve and pilot burner are all intact and making good electrical connection. Check to make sure that the ceramic insulator on the pilot ignitor or sensor is not broken or cracked, if all are intact replace the ignition control "IC".

4. The draft motor runs and the sparker sparks at the pilot burner but the pilot does not ignite and a gas odor is not detected at the draft motor outlet.

   a. Check to make sure gas is being supplied to the unit. Make sure that the gas pressure to the unit is within the proper limits as described in the "POST START CHECK LIST" and that the pilot adjust screw is allowing some flow of gas as described in "PILOT CHECKOUT".

   b. Check all wiring between the ignitor control and the gas valve. Check to make sure the ground connections are intact.

   c. If the wiring is intact, check for 24 volts across terminals "PV" and "COMMON" on the ignitor control. If 24 volts is not present, replace the ignitor control.

   d. If 24 volts is present, remove the pilot burner and remove the pilot orifice from the pilot burner. The orifice is removed in the direction opposite the flow of gas. Inspect the orifice for obstruction. If it is clear, replace the main gas valve.

5. The sparker sparks at the pilot burner but the pilot does not ignite and a gas odor is detected at the draft motor outlet.

   a. Adjust the pilot adjust screw on the gas valve as described in “PILOT CHECKOUT”.

   b. Check the supply pressure as described in “POST START CHECK LIST”. Make adjustments as necessary.

   c. Check the pilot orifice for obstruction as described in Item 4. Clean as needed but the problem should not be the gas valve.

6. The pilot burner ignites but the sparker continues to spark and the main burners do not ignite.

   a. Make the same checks and adjustment as described in Item 5.

   b. Make sure that the pilot burner is not bent or damaged.

   c. Make sure that the ground connections at the pilot burner, gas valve and ignitor control are intact. Check the high tension wire for good electrical connection. If all are intact, replace the ignitor module.

7. The pilot burner lights and the spark stops but the main burners do not light.

   a. Check electrical connections between the ignitor control and the gas valve. If intact, check for 24 volts across terminals “MV” and “COMMON” terminals. If not voltage detected, replace ignitor control If voltage is present, replace gas valve.

8. Furnace lights with roll out or one burner has delayed ignition.

   a. Make sure that the pilot burner is aligned properly with the carryover as described in “PILOT CHECKOUT”.

   b. Make sure that the carryovers on adjoining burners are screwed fast and are level with respect to one another.

9. Main burners light but exhibit erratic flame characteristics.

   a. Adjust air shutters as described in “BURNER AIR SHUTTER ADJUSTMENT”.

   b. Check the main burner orifices for obstruction and alignment. Removal procedure is described in “BURNER INSTRUCTIONS”. Clean or replace burner orifices and burners as needed.

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